

What is claimed is:

- 102(4)
1. A filter system, comprising:
20 a wire having a proximal end and a distal end;
22 a filter for collecting debris from a body lumen, said filter being disposed proximal of the distal end of said wire;
14 an outer shaft having a proximal end, a distal end, and a distal sheath extending distally thereof;
28 a dilator tip slidably disposed in the distal sheath and movable between a distally advanced position and a proximally retracted position.
 2. The filter system of claim 1, wherein said dilator tip comprises a generally circular cross section and a conical shaped distal portion.
 3. The filter system of claim 1, further comprising a resilient member disposed in the sheath.
 4. The filter system of claim 3, wherein said resilient member comprises a spring coil.
 5. The filter system of claim 3, wherein said spring comprises one or more struts longitudinally disposed along the wire.

6. The filter system of claim 1, further comprising an inner shaft disposed about the wire, said inner shaft having a proximal end and a distal end.

7. The filter system of claim 6, wherein the length of the inner shaft is substantially shorter than the length of the outer shaft.

~~8.~~ The filter system of claim 6, wherein the length of the inner shaft is substantially the same as the length of the outer shaft.

~~9.~~ The filter system of claim 8, further comprising a ~~hub~~ disposed about the proximal end of the outer shaft, said hub adapted to prevent relative motion between the inner and outer shafts.

10. The filter system of claim 6, wherein said resilient member is disposable at least in part about a portion of the inner shaft.

11. The filter system of claim 6, wherein said resilient member is disposable at least in part about a portion of the inner shaft, and wherein a portion of the resilient member is fixedly attached to a portion of the inner shaft.

~~12.~~ The filter system of claim 6, further comprising a ~~plunger~~ assembly.

13. The filter system of claim 12, wherein said plunger assembly is attached to the proximal end of the inner shaft.

14. A filter system, comprising:
a filter wire having a proximal end and a distal end;
a filter for collecting debris from a body lumen, said filter being disposed proximal of the distal end of the filter wire;
a shaft having a proximal end, a distal end, and a distal sheath disposed at least in part distally thereof, said distal sheath having a reduced inner diameter portion; and
a dilator tip slidably disposable along the filter wire, said dilator tip having a plurality of recessed surfaces adapted to engage the reduced inner diameter portion of said distal sheath.

15. The filter system of claim 14, wherein said plurality of recessed surfaces includes:

a first recessed surface disposed on a proximal portion of the dilator tip; and
a second recessed surface disposed on the dilator tip distal said first recessed surface.

16. The filter system of claim 15, further comprising a third recessed surface disposed on the dilator tip distal said second recessed surface.

17. A device for removing an intravascular filter from a body lumen, comprising:

an outer shaft having a proximal end, a distal end, and a distal sheath extending distally thereof;

a dilator tip slidably disposable along a filter wire at least in part distally of the distal sheath; and

a resilient member disposed along the filter wire proximal the dilator tip, said resilient member adapted to bias the dilator tip toward the distal end of the distal sheath.

18. The device of claim 17, wherein said resilient member is a spring.

19. A device for removing an intravascular filter from a body lumen, comprising:

an outer shaft having a proximal end, a distal end, and a distal sheath disposed distally thereof, said distal sheath having a reduced inner diameter portion; and

a dilator tip slidably disposable along a filter wire, said dilator tip having a plurality of recessed surfaces adapted to engage the reduced inner diameter portion of said distal sheath.

20. The device of claim 19, wherein said recessed surface includes:

a first recessed surface disposed on a proximal portion of the dilator tip; and

a second recessed surface disposed on the dilator tip distal said first recessed surface.

~~21.~~ The device of claim 20, further comprising a third recessed surface disposed on the dilator tip distal said second recessed surface.

22. A method for retrieving an intravascular filter from a body lumen, comprising the steps of:

providing a filter retrieval device along a filter wire to a point within a body lumen proximal a filter, said filter retrieval apparatus having a distal sheath extending distally from an outer shaft, a dilator tip slidably disposable along the filter wire, and a resilient member disposed along the filter wire proximal said dilator tip;

advancing the filter retrieval device such that said resilient member forces said dilator tip to attach to the filter and retract the filter at least in part within the distal sheath; and

removing the filter retrieval device containing the filter from the body.

23. A method for retrieving an intravascular filter from a body lumen, comprising the steps of:

providing a filter retrieval device having a distal sheath extending distally from a shaft, and a dilator tip slidably disposable along a filter wire, wherein said distal sheath has a reduced inner diameter portion adapted to engage a first recessed surface and a second recessed surface disposed on said dilator tip;

attaching the dilator tip to the distal sheath in a first position, wherein said reduced inner diameter portion is engaged along said first recessed surface;

advancing the filter retrieval device distally along the filter wire until the distal end of said dilator tip attaches to the filter,

retracting the dilator tip to a second position, wherein said reduced inner diameter portion engages said second recessed surface, and wherein said filter is disposed at least in part within the distal sheath; and

removing the filter retrieval device containing the filter from the body.

24. A method for retrieving an intravascular filter from a body lumen as in claim 23, further comprising the steps of providing a dilator tip having a third recessed surface, and further retracting the dilator tip proximally to a third position such that said reduced inner diameter portion engages said third recessed surface.

25. A method for retrieving an intravascular filter from a body lumen, comprising the steps of:

providing a guide catheter to a body lumen, said guide catheter having a flared distal portion;

inserting a filter wire through said guide catheter to a desired point within the body;

advancing an intravascular filter along the filter wire;

advancing a dilator along the filter wire until said dilator attaches to the filter;

advancing an outer sheath about the filter wire and dilator to a point distal the proximal end of the filter; and

removing the collapsed filter from the body.

26. A method for retrieving an intravascular filter as in claim 25, wherein the removal step comprises retracting the dilator proximally.

27. A method for retrieving an intravascular filter as in claim 25, wherein the removal step comprises retracting the dilator and outer sheath proximally.

28. A method for retrieving an intravascular filter as in claim 25, further comprising the step of providing a pushing member attached to the outer sheath, and advancing the outer sheath about the filter wire and dilator by means of said pushing member.

29. A method for retrieving an intravascular filter as in claim 25, further comprising the step of inserting a second wire through the guide catheter and outer sheath subsequent to removing the collapsed filter from the body